

# Analysis of the Physical and Functional Characteristics of Cell Clumping in Lactose-Positive Transconjugants of *Lactococcus lactis* ssp. *lactis* ML3

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Transconjugants of *Lactococcus lactis* ssp. *lactis* ML3 that acquire the ability to utilize lactose often exhibit self-aggregation and become able to transfer the ability to utilize lactose at frequencies  $10^2$  to  $10^5$  times higher than strain ML3. Our laboratory investigated the physical and functional characteristics of cell aggregation in ML3 transconjugants. Results showed that donor cell auto-aggregation was dissociated when cells were suspended in buffers that contained EDTA or when they were briefly exposed to proteinase K or  $\alpha$ -chymotrypsin. Conjugation studies revealed that disruption of donor cell aggregation substantially decreased the efficiency of lactose plasmid transfer. Dissociation by EDTA or proteolytic enzyme treatments was reversible, and recovery of high frequency lactose plasmid transfer ability accompanied the restoration of donor self-aggregation. Analysis of cell-surface proteins isolated from lactose-positive, aggregation-positive and from lactose-positive, aggregation-negative transconjugants of ML3 by PAGE indicated that aggregation-positive cells produced a unique protein of approximately 125 kDa. The results suggested that cell aggregation was essential for high frequency lactose plasmid transfer in ML3 transconjugants and that at least one large protein was involved in aggregation.

Key Words: *Lactococcus* sp. • conjugation • cell clumping

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